CALIFORNIA
AIR RESOURCES BOARD

Public Workshop to Discuss Implementation

Low Carbon Fuel Standard

NOVEMBER 28, 2018
SACRAMENTO, CA

CARB

Agenda

- Overview of All Crediting Opportunities
- Application Process Details for:
  - Fuel Pathway based Crediting
  - Zero Emission Vehicle (ZEV) Fueling Infrastructure Crediting
  - Crediting under the Carbon Capture and Sequestration (CCS) Protocol
- Reporting and Credit Generation Details for:
  - Fuel Pathway based Crediting
  - Zero Emission Vehicle Fueling Infrastructure Crediting
  - Project-based Crediting
- Credit Transfer Reporting
- Implementation of Third-Party Verification
- Next Steps

OVERVIEW OF ALL LCFS CREDITING OPPORTUNITIES

- ❑ FUEL PATHWAY BASED CREDITING
- ❑ PROJECT-BASED CREDITING
- ❑ ZEV INFRASTRUCTURE CREDITING

- ❑ INTRODUCTION TO LCFS DATABASE MANAGEMENT SYSTEM

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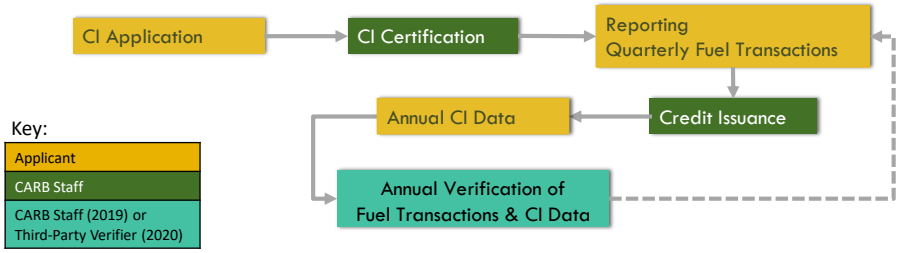
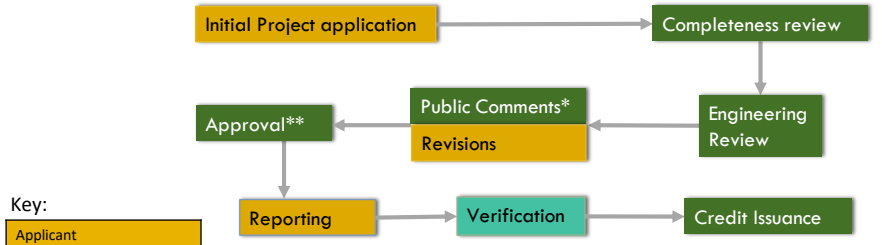
Fuel Pathway Based Crediting

- All transportation fuels have a certified carbon intensity (CI)
  - Lookup Table: Simplest pathways, including gasoline and diesel; CI is predetermined by CARB
  - Tier 1: For the most common low carbon fuels; use a Simplified CI Calculator to determine CI
  - Tier 2: For innovative, next generation fuel pathways, including fuel pathways with carbon capture and sequestration, use the full CA-GREET 3.0 model
- Credits are calculated based on CI of the fuel, EER of the vehicle-fuel combination, and the quantity of fuel that is transacted in each quarter



Project-based Crediting

- Refinery investment credits, renewable hydrogen used at refineries to make conventional fuels, innovative crude projects, low-complexity/low-energy-use refinery credits, and carbon capture and sequestration using direct air capture
  - Register as a project operator
- Credits are calculated on the basis of annual life cycle metric tons of greenhouse gas reduction

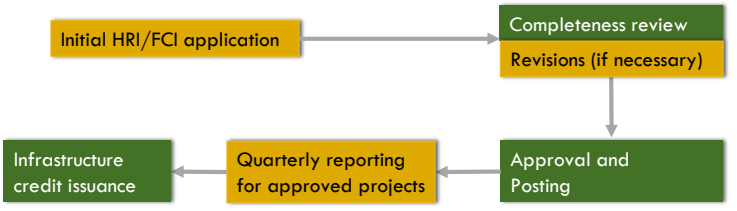


Key:
- Applicant
- CARB Staff
- CARB Staff (2019) or Third-Party Verifier (2020)

**Posting for public comment is not required for refinery renewable hydrogen projects*
*** For CCS Projects, approval will not occur until Permanence Certification is completed*

Zero Emission Vehicle Fueling Infrastructure Crediting

- To support deployment of Hydrogen Refueling Infrastructure (HRI) and direct current Fast Charging Infrastructure (FCI)
- Credits are calculated on the basis of station capacity and utilization
- Stations must also have valid fuel pathways for electricity or hydrogen, and report fuel dispensed quarterly



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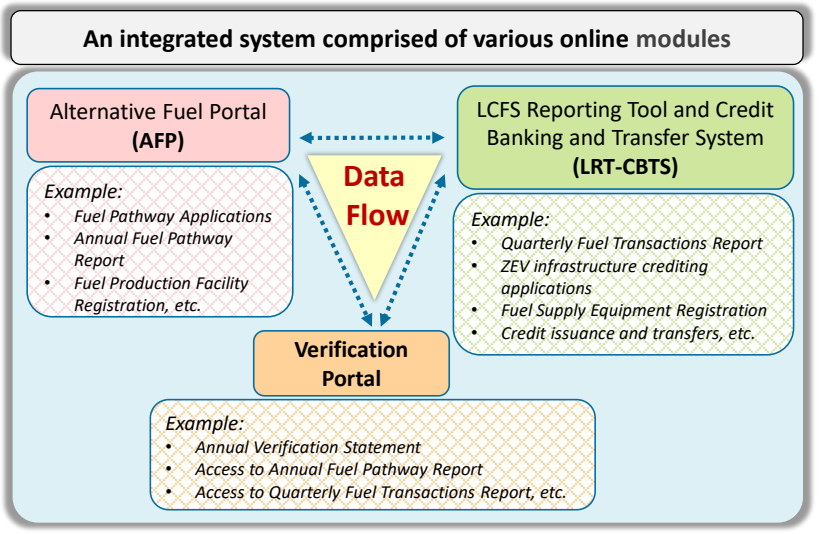
The LCFS Database Management System



APPLICATION PROCESSES

- FUEL PATHWAYS
  - Transition from CA-GREET2.0 to CA-GREET3.0
  - New Fuel Pathway Applications
  - Electricity and Hydrogen Pathways
  - Dairy & Swine Manure Pathways
  - Substitute Pathways
  - Joint Applicants
- ZEV FUELING INFRASTRUCTURE
- CARBON CAPTURE AND SEQUESTRATION
  - Fuel Pathways with CCS
  - Project-based Crediting with CCS
  - Permanence Certification

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Fuel Pathways Certified Prior to 2019 — Transition Deadlines

The following pathways will automatically transition to new CI values for Q1 2019 reporting:

- Lookup Table Pathways for CARBOB, ULSD, Fossil CNG, and Grid Electricity
- Temporary Fuel Pathways (requires new request)

The following pathways may be used until a new pathway is certified to replace the Legacy pathway—or for fuel transactions occurring through December 31, 2020:

- All Tier 1 and Tier 2 Pathways certified using CA-GREET2.0
- Existing (Legacy) Lookup Table pathways for Hydrogen and Biomethane

Upon certification of a new pathway for a fuel production facility using CA-GREET3.0, all previously certified pathways for that facility will be deactivated

- A one-quarter overlap will allow for inventory management in the transition from legacy to new pathways

Inventory Management

- A crosswalk table will be generated for all newly certified pathways that properly correlate back to a legacy pathway (as applicable)
  - Both pathways will be active during the first quarter that the newly certified pathway is available
- Fuel reporting entities won't need to reset inventories in their accounts–LRT-CBTS will use the same crosswalk table to reset Total Obligated Amount (TOA) and Total Amount (TA) for newly certified pathways
- After legacy pathways expire December 31, 2020
  - Carryover inventories in 2021 can be reported as "sales without obligation" using the appropriate substitute pathways

Provisional Pathways Certified Prior to 2019

- CI values for provisional pathways in the system prior to 2019 will continue to be evaluated using CA-GREET2.0 until 24 months of data is reported
- After reaching 24-month requirement, the applicant may request certification under CA-GREET3.0 using the same dataset
- If a new application is submitted using CA-GREET3.0 for an existing provisional pathway:
  - Previously certified provisional pathway under 2.0 will be deactivated when 3.0 value is certified
  - Such pathways will also be evaluated using CA-GREET2.0 to check compliance with previously certified CI
    - If the operational CI determined using CA-GREET2.0 exceeds the provisional CI, Executive Officer will initiate credit adjustments for entirety of the period for which the provisional CI was used

Status of Current Pending Applications

- Staff will prioritize review and certification of all pathway applications received prior to the end of Q3 2018
- Applications received in Q4 2018 will be reviewed after all previously submitted applications are reviewed
  - No guarantee that applications received toward the end of Q4 2018 will be reviewed and certified
- Applications not certified in 2018 will require submission of new applications in 2019 using CA-GREET3.0

NEW FUEL PATHWAYS

EFFECTIVE JANUARY 2019 AND BEYOND

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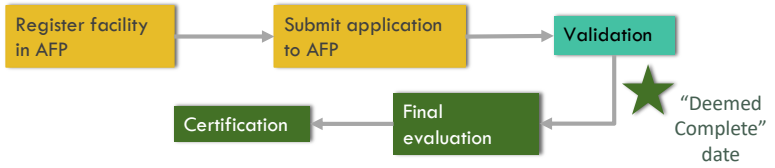
Tier 1 Pathways using CA-GREET3.0

New applications using Tier 1 Simplified CI Calculators will be accepted beginning January 2019

- Third-party validation requirement: effective beginning January 2020
- Applications submitted in 2019 must include all supporting documentation for Executive Officer validation



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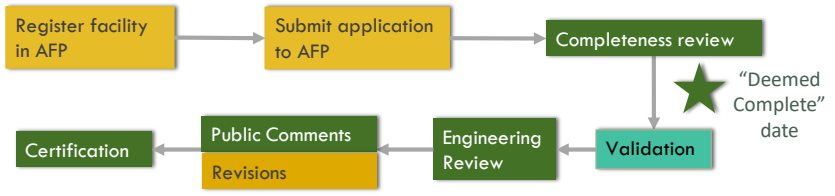
See §95488.6 for complete Tier 1 application requirements

Tier 2 Pathways using CA-GREET3.0

New applications for Tier 2 pathways will be accepted beginning January 2019

- Third-party validation requirement: effective beginning January 2020
- Applications submitted in 2019 must include all supporting documentation for Executive Officer validation



Key:

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See §95488.7 for complete Tier 2 application requirements

Lookup Table Pathways with No Application Required

Conservative Lookup Table pathways are used for expedited fuel reporting

- Some require an application in the AFP, some do not
- The pathways below do not require an application; reporting entities register directly in the LRT-CBTS and begin reporting

Fuel	Fuel Pathway Description	Carbon Intensity
CARBOB	CARBOB - based on the average crude oil supplied to California refineries and average California refinery efficiencies	100.82
Diesel	ULSD - based on the average crude oil supplied to California refineries and average California refinery efficiencies	100.45
Compressed Natural Gas	Compressed Natural Gas from Pipeline Average North American Fossil Natural Gas	79.21
Propane	Fossil LPG from crude oil refining and natural gas processing used as a transport fuel	83.19
Electricity	California average grid electricity used as a transportation fuel in California	CI will be updated in Q1 2019

Lookup Table Pathways with Application Required

Fuel	Fuel Pathway Description	Carbon Intensity
Electricity	Electricity that is generated from 100 percent zero-CI sources used as a transportation fuel in California	0.00
	Electricity supplied under the smart charging or smart electrolysis provision	CI values will be updated in Q1 2019
Hydrogen	Compressed H2 produced in California from central SMR of North American fossil-based NG	117.67
	Liquefied H2 produced in California from central SMR of North American fossil-based NG	150.94
	Compressed H2 produced in California from central SMR of biomethane (renewable feedstock) from North American landfills	99.48
	Liquefied H2 produced in California from central SMR of biomethane (renewable feedstock) from North American landfills	129.09
	Compressed H2 produced in California from electrolysis using California average grid electricity	164.46
	Compressed H2 produced in California from electrolysis using zero-CI electricity	10.51

See §95488.5 for complete Lookup Table pathway application requirements

New Electricity and Hydrogen Lookup Table Pathways (1)

Zero-CI Electricity Lookup Table Pathway

- Apply in the AFP
- Available to report EV charging and other electric transportation applications (fixed guideways, eTRU, eCHE, eOGV, etc.)
- Zero-CI electricity sources are defined in §95488.1
- Electricity with a CI that is non-zero, but lower than grid average value, must apply for Tier 2 pathway
- Option to demonstrate indirect supply through green tariff or renewable energy certificate (REC) retirement

Six Hydrogen Lookup Table Pathways

- Apply in the AFP
- All Lookup Table pathways for hydrogen reflect production in California; hydrogen produced out-of-state requires a Tier 2 Pathway application

See §95488.1 for resources that qualify as zero-CI
See Lookup Table Pathways - Technical Support Documentation for CI calculation details

New Electricity and Hydrogen Lookup Table Pathways (2)

Smart Charging for Electricity

- Apply directly in the LRT-CBTS
- Smart Charging Lookup Table Pathway cannot be used in conjunction with a zero- or low-CI electricity pathway
- Demonstrate hourly metering capability and proof of enrollment in an Load-Serving Entity (LSE) Time-of-Use rate if available
- Report hourly kilowatt hours (kWh) per fuel supply equipment (FSE) using a "Smart Charging" template every quarter

Smart Electrolysis for Hydrogen

- Apply directly in the LRT-CBTS
- Smart Electrolysis Lookup Table Pathway must be used in conjunction with a hydrogen pathway using average grid electricity
- Report hourly kWh for each production facility using a "Smart Electrolysis" template every quarter

Low-CI Electricity: Book-and-Claim Accounting

Using Book-and-claim Accounting for Indirectly Supplied Low-CI Electricity (including Zero-CI Lookup Table and Tier 2 Pathways)

- Through Participation in Green Tariff Programs
  - LSEs who offer green tariff programs apply in the AFP for approval of their resource mix
  - Fuel reporting entities (green tariff customers) register in the LRT-CBTS to report using the certified CI for their LSE's green tariff
  - Reporting entity must demonstrate enrollment in the specific green tariff
- Through Retirement of Renewable Energy Certificates (REC)
  - Fuel Reporting Entities must also be the Fuel Pathway Applicant and must apply in the AFP
  - Must demonstrate account in WREGIS under the same entity name used in the fuel pathway application and for reporting in the LRT-CBTS
  - Must demonstrate REC retirement on behalf of the LCFS in the quarterly report

See §95488.8(i) for requirements for using book-and-claim accounting

Dairy & Swine Manure Pathways (1)

- Dairy/Swine Manure Projects do not need to be registered under Cap-and-Trade nor an Offset Project Registry
  - However, if Registry Offset Credits (ROC) are generated for methane reductions that are also claimed as LCFS credits, the Executive Officer will determine the appropriate quantity of ROCs to be retired for LCFS credit generation
- Consistent with all other fuel pathways, a minimum of 3 months of operational data is required for certification
  - If a prior year of operational data verified under the Offset Protocol for Livestock Projects exists, it must be submitted for CI determination
- Third-party validation and verification by LCFS-accredited verifiers will phase in on the same schedule as other pathways
- In 2021, verification of the annual fuel pathway report and fuel transactions will include the 2019 and 2020 data years

Dairy & Swine Manure Pathways (2)

Use of the Tier 1 Simplified CI Calculator for Biomethane from Anaerobic Digestion of Dairy and Swine Manure

- The Tier 1 calculator only works for projects that meet the following condition:
  - Project Methane Generation (collected and metered) must be equal or greater than Baseline Methane Emissions:

    $$CH_{4\ meter} \geq [BE_{CH4,AS} + BE_{CH4,non\text{-}AS}]$$
  - If this condition is not met, can apply as a Tier 2 pathway
  - Tier 2 pathways may utilize and modify an applicable Simplified CI Calculator to determine emission factors or CI, with Executive Officer approval
- Fuel pathways utilizing manure from livestock types not included in the Protocol (e.g., poultry, beef cattle) do not qualify for avoided methane
  - Due to uncertainty in the baseline treatment conditions and emission factors
  - May apply using the Tier 1 Simplified CI Calculator for Biomethane from Organic Waste

Substitute Pathways and Default Blends

Substitute Pathways are used for liquid fuel exports when the actual CI values are not known

- Values to be used in a compliance year are based on the volume-weighted average CI for that fuel in most recent available four reporting quarters
  - E.g., substitute CI values for calendar year 2019 will be based on the CI values from Q4 2017 to Q3 2018
  - Similarly, default blend percentage values for fuel blends are based on average values in most recent available four reporting quarters
- Posted on LCFS website in early January 2019 to be used for 2019 compliance year
  - LCFS Pathway Certified Carbon Intensities https://www.arb.ca.gov/fuels/lcfs/fuelpathways/pathwaytable.htm
- Updated annually

Joint Applicants for Fuel Pathways

- For fuel pathways that involve multiple entities contributing pathway-specific data, multiple entities can be joint applicants
  - Enables parties to maintain data confidentiality
- Joint applicants are optional for specified source feedstocks
  - Enables a feedstock supplier to establish site-specific feedstock production/processing emissions
  - Simplifies the process for one feedstock supplier to contribute to multiple fuel pathways
- Joint applicants may elect to be responsible for separate third-party validation and verification
- Alternatively, a single entity may be designated as the pathway applicant but must then have the ability to take on all forward-looking reporting and verification requirements and accept liability for inaccurate information across the full pathway

See §95488(b) and §95500(a) and (b) for information regarding joint applicants

APPLICATION PROCESS FOR ZERO EMISSION VEHICLE (ZEV) FUELING INFRASTRUCTURE

Zero Emission Vehicle Infrastructure Applications

- Hydrogen Refueling Infrastructure (HRI) and DC Fast Charging Infrastructure (FCI)
- Applicant must register and submit application in the LRT-CBTS
- For HRI, each application represents a single station
- For FCI, each application represents a single site which could have multiple chargers
- Applications will be time-stamped upon submission and will be reviewed in that order
- Staff developing necessary application process in the LRT-CBTS
- A listserve notice will announce when the system will be ready to begin accepting applications in Q1 2019

See §95486.2 for information on crediting for ZEV fueling infrastructure

Available Total Capacity for Hydrogen Refueling Infrastructure

- Applications submission will be cut off if the estimated potential HRI credits from approved applications in a quarter exceed 2.5% of deficits in prior quarter. Example:
  - For applications submitted in Q1 2019 – 2.5% deficits in Q4 2018
  - For applications submitted in Q2 2019 – 2.5% deficits in Q1 2019
- Total HRI capacity available to be approved for a given quarter will be calculated based on the equation for estimated potential HRI credits, which factors in HRI credits generated in the prior quarter

See §95486.2(a)(3)(A) for estimated potential HRI credit equation

- For Q1 and Q2 2019, as no HRI credits will be generated in the prior quarters, staff will conservatively estimate the total allowable capacity using the HRI crediting equation and the following assumptions:
  - Throughput based on the dispensed hydrogen reported for the prior quarter
  - Average CI for dispensed hydrogen is 75 g/MJ
  - Uptime multiplier is 1.0

➢ This translates to about 45,000 kg/day available total capacity for HRI in Q1 2019; or about 75 stations with a capacity of 600 kg/day each

See §95486.2(a)(5) for the HRI crediting equation

Hydrogen Dispensing Capacity using the HySCapE 1.0 Model

- Use HySCapE 1.0 Mass Dispensed at 95% SOC limit as the measure of station nameplate capacity
- Start Time and End Time will be based on permitted hours of operation
  - If 24 hours then enter 00:00 for START TIME and 23:59 for END TIME
  - If permitted between 6 am to 8 pm, enter 06:00 for START TIME and 20:00 for END TIME
- Use Default settings for other model inputs:
  - Vehicle Demand Profile: ChevronFriday
  - Time Between Fills: 255 seconds
  - Vehicle Storage Volume: 126 liters
  - Storage Level to Trigger Delivery: 30%
  - Hourly Distribution: Even

Hydrogen Refueling Infrastructure – Application Requirements

Additional Clarification on HRI application requirements:

- If CI value for hydrogen is not known at the time of application (e.g., for a station yet to be built), provide best estimate based on expectations for near-term (one to two year) hydrogen supply
- Station location justification is required in all applications
  - Stations approved under the California Energy Commission's (CEC) AB 8 grant funding are exempt, provided that the capacity of the station has not changed subsequent to CEC approval

See §95486.2(a)(2) for complete HRI application requirements

Available Total Capacity for Fast Charging Infrastructure

- Applications submission will be cut off if the estimated potential FCI credits from approved applications in a quarter exceed 2.5% of deficits in prior quarter. Example:
  - For applications submitted in Q1 2019 – 2.5% deficits in Q4 2018
  - For applications submitted in Q2 2019 – 2.5% deficits in Q1 2019
- Total capacity available to be approved for a given quarter will be calculated based on the equation for estimated potential FCI credits, which factors in FCI credits generated in the prior quarter

See §95486.2(b)(3)(A) for estimated potential FCI credit equation

- For Q1 and Q2 2019, as no FCI credits will be generated in the prior quarters, staff will conservatively estimate the allowable capacity using the FCI crediting equation and the following assumptions:
  - Quantity of electricity dispensed is zero
  - CI is equal to the most recently-approved Lookup Table CI value for California average grid electricity
  - Uptime multiplier is 1.0

➢ This translates to more than $1{,}000{,}000\ \frac{\mathrm{kW}h}{day}$ available total capacity for FCI in Q1 2019; or about 3,000 DCFCs with a power rating of 100 kW

See §95486.2(b)(5) for the FCI crediting equation

Fast Charging Infrastructure – Application Requirements

Additional Clarification on FCI application requirements

- In order to provide evidence for site availability, include evidence of site ownership or a conditional agreement with the site owner

See §95486.2(b)(2) for complete FCI application requirements

CARBON CAPTURE AND SEQUESTRATION PROTOCOL

DETAILS ON CCS APPLICATIONS

THROUGH FUEL PATHWAYS AND THROUGH PROJECT-BASED CREDITING

Carbon Capture and Sequestration Eligibility & Crediting

Examples of how the CCS Protocol can be used:

- Low carbon fuel pathway (e.g., ethanol or biogas)
- Refinery investment (e.g., steam methane reforming)
- Innovative crude (e.g., co-gen at oilfield)
- Direct air capture

General requirements for Crediting

- Credits go to the capture facility
- Storage facility must be a co-applicant
  - Capture and storage facilities do not need to be co-located
- All CCS projects must receive Permanence Certification before LCFS credit generation is possible

See §95490 and the CCS Protocol for complete application requirements

Carbon Intensity Calculation and Credit Generation for CCS

- Calculate GHG reductions in metric ton/year as described in the Accounting Requirements
  - Life cycle-based approach
  - Serve as credits awarded under project-based crediting provisions (Refinery Investment Credit Program, Direct Air Capture, etc.)
- For fuel pathways involving CCS, CI is calculated as follows:
  - Divide the GHG reductions in MT (above) by MJ of fuel produced in a given year to obtain a CI in gCO_2e/MJ
  - Subtract this CI from the fuel pathway CI without CCS to obtain the net CI for the fuel pathway including CCS

Fuel Pathways with Carbon Capture and Sequestration

Application Process:

- Apply for fuel pathway through the AFP in parallel with CCS permanence certification application
- Fuel pathway with CCS may be approved prior to Permanence Certification, but credits cannot be generated under that pathway until Permanence Certification is issued

Crediting Method:

- Fuel Pathway with reduced CI
  - Must maintain minimum level of injection to maintain CI
  - Must maintain compliance with the Permanence Protocol
- Must have an approved fuel pathway without CCS for situations when capture is not operational (and before permanence certification is issued)

Refinery Investment Projects with Carbon Capture and Sequestration

Application Process:

- Register as a project operator in LRT-CBTS and submit application
- May submit application for review in parallel with Permanence Certification application
- Credits will not be issued prior to issuance of Permanence Certification

Crediting Method:

- Credits to be issued after injection and after verification of reported values from both the capture facility and sequestration facility operator(s)

Innovative Crude Projects with Carbon Capture and Sequestration

Application Process:

- Register as a project operator in LRT-CBTS and submit application
- May submit application for review in parallel with Permanence Certification application
- Credits will not be issued prior to issuance of Permanence Certification
- Reduction in CI to be determined based on difference between oil production with and without CCS

Crediting Method:

- Credits to be issued after verification of reported values from both the capture facility and sequestration facility operator(s)

Direct Air Capture Projects

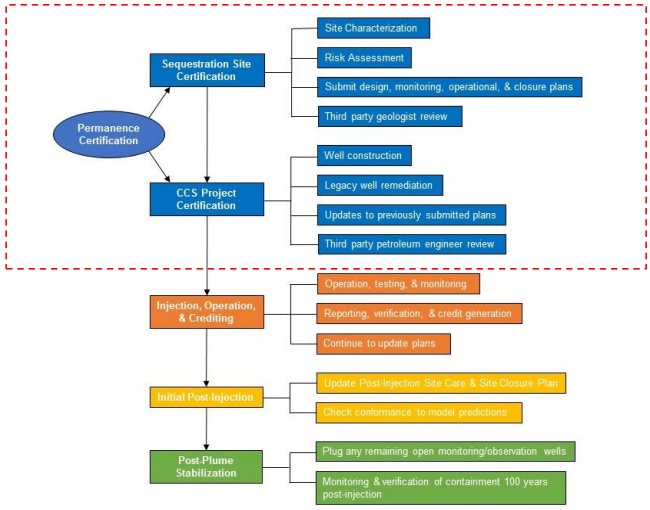
Application Process:

- Register as a project operator in LRT-CBTS and submit Permanence Certification application
- Direct Air Capture projects are not innovative crude projects
  - Direct air capture credits generated regardless of sequestration type

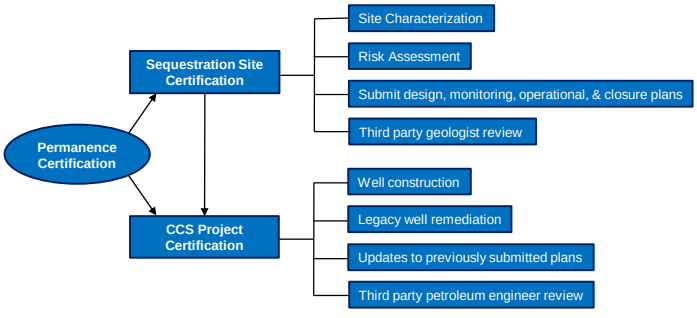
Crediting Method:

- Credits to be issued after injection, and after verification of reported values from the capture facility and sequestration facility operator(s)

CCS Protocol Provisions



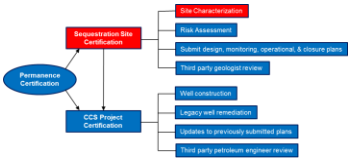
Permanence Certification: Overview



- Apply for permanence certification
- Permanence certification consists of two applications:
  - Sequestration Site Certification Application
  - CCS Project Certification Application

Sequestration Site Certification: Site Characterization

- Geologic Evaluation
  - Formation Testing
  - Well Logging
- Characterize confining layers
- Identify faults and determine whether they are transmissive
- Delineate Storage Complex and provide Computational Modeling Results
  - Must show 90% chance of more than 99% containment over project life (including post-injection site care period)
- Submit Corrective Action Plan
- Submit Baseline Testing and Monitoring Plan
- Identify whether need for dissipation interval



Sequestration Site Certification: Site-Based Risk Assessment

Requirements

- Characterize potential risks of adverse impacts to:
  - Environment
  - Health & Safety
- Minimum Evaluation:
  - Leakage risk
  - Risk scenarios in the Emergency and Remedial Response Plan
- Risk Management Plan:
  - Identify risks and how risks are ranked
  - Steps to manage, monitor, avoid, and minimize risk

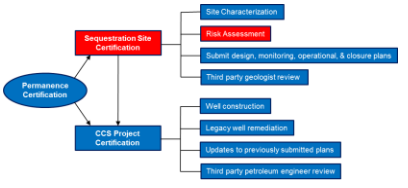


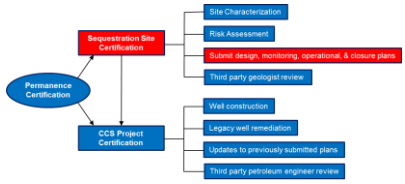
Table 1. Risk scenario classification

	Insubstantial[2]	Substantial[2]	Catastrophic[2]
> 5%[1]	Medium risk	High risk	High risk
1-5%[1]	Low risk	Medium risk	High risk
< 1%[1]	Low risk	Medium risk	Medium risk

[1] Probability of occurrence over 100 years
[2] Severity of potential consequences

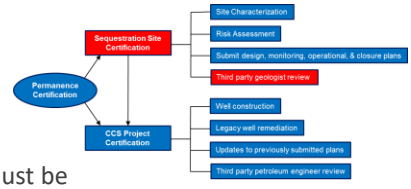
Sequestration Site Certification: Summary of Required Information & Plans

- Site Evaluation
- Risk Assessment
  - Risk Management Plan
- Corrective Action Plan
- Baseline Testing and Monitoring Plan
- Well Construction Plan
- Testing and Monitoring Plan
- Well Plugging and Abandonment Plan
- Post-Injection Site Care and Site Closure Plan
- Emergency and Remedial Response Plan
- Financial Responsibility Demonstration
  - Initial Buffer contribution calculation
- Legal Understanding Demonstration



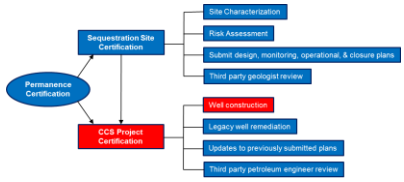
Sequestration Site Certification: Third Party Geologist Review

- Application for Sequestration Site Certification must be reviewed and certified by a professional geologist (PG) prior to submittal to CARB
- Professional Geologist credentials and history of work with applicant must be submitted to and approved by CARB prior to review
- PG should include a report in their review commenting on each section of the application and their findings related to whether the section meets the requirements of the CCS Protocol and why
- PG must visit site and confirm that the site description is accurate geographically and geologically
- PG must certify that application materials are accurate and follow best geologic practices



CCS Project Certification: Well Construction

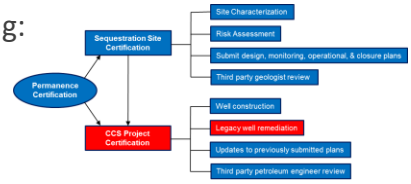
- Formation Testing and Well Logging Report
- Updated Storage Complex Delineation and Computational Modeling Results
- Baseline Testing and Monitoring Report
- Well Construction and Pre-injection Testing Report



CCS Project Certification: Legacy Well Remediation

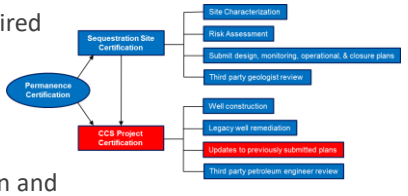
Corrective Action Report describing:

- Methods used to identify wells that required corrective action
- Corrective actions taken on deficient wells that:
  - Penetrate the storage complex
  - Are within the surface projection of the storage complex
- Any historical records search must include a description of the completeness of state or federal databases



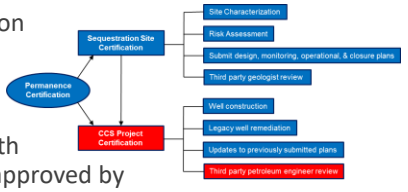
CCS Project Certification: Plan Updates & Required Reports

- Updates to information or plans required by Sequestration Site Certification application
- Formation Testing and Well Logging Report
- Updated Storage Complex Delineation and Computational Modeling results
- Corrective Action Report
- Baseline Testing and Monitoring Report
- Well Construction and Pre-Injection Testing Report



CCS Project Certification: Third Party Petroleum Engineer Review

- Application for CCS Project Certification must be reviewed and certified by a professional petroleum engineer (PE) prior to submittal to CARB
- PE credentials and history of work with applicant must be submitted to and approved by CARB prior to review
- PE should include a report in their review commenting on each section of the application and their findings related to whether the section meets the requirements of the CCS protocol and why
- PE must visit site and confirm that the wells were drilled, cemented and logged accurately and properly, and confirm metering and type of equipment on site
- PE must certify that application materials are accurate and follow best petroleum engineering practices



CCS Application Review Timelines

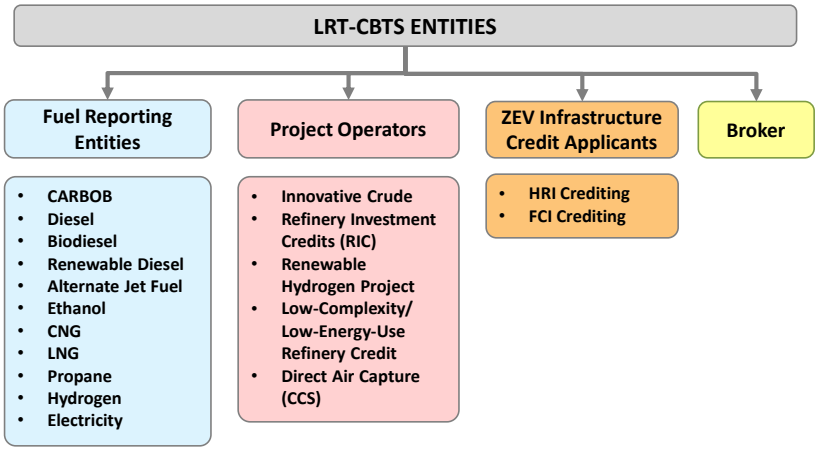
- Timelines consider ideal situation where applicant is very responsive and little back-and-forth is needed
- Longer response from applicant or incomplete information in submittal may increase timelines
- Timelines for applicants who already have functional projects may be reduced as sequestration site and CCS project certification applications can be combined and reviewed simultaneously
- For applications submitted in Q1, crediting may be possible by end of Q3 2019

REPORTING & CREDIT GENERATION

- ❑ OVERVIEW OF LRT-CBTS ENTITIES
- ❑ REPORTING AND CREDITING TIMELINES
- ❑ RECONCILIATION REQUIREMENTS
- ❑ FUELING SUPPLY EQUIPMENT (FSE) REGISTRATION
- ❑ THREE-QUARTER TRANSFER LIMIT
- ❑ ZEV INFRASTRUCTURE REPORTING
- ❑ CREDIT TRANSFERS

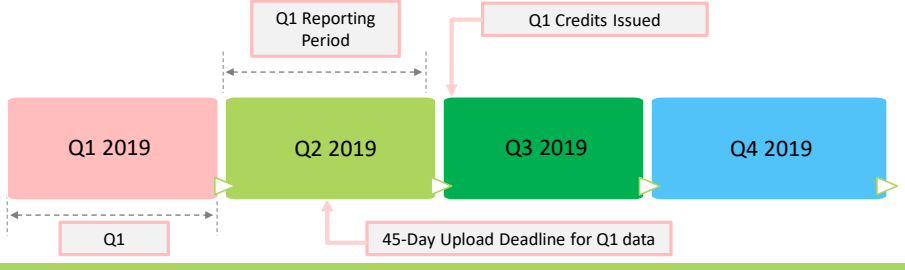
Overview of Entities in the LRT-CBTS

The LRT-CBTS is being updated to facilitate registration of the following entities:

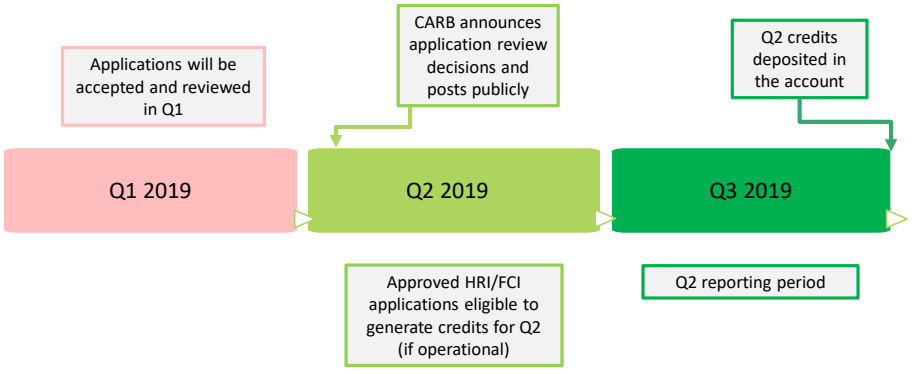


Fuel Pathway Transactions Reporting & Crediting Timeline

- **Quarterly Data Upload Deadline:** Upload fuel transactions data within the first 45 days after the end of quarter to facilitate reconciliation
- **Quarterly Reporting Deadline:** The quarterly report is due at the end of following quarter
- **Credit Generation:** Credits will be issued for reconciled fuel volumes after the reporting period is over



ZEV Fueling Infrastructure Reporting & Crediting Timeline



Project-based Reporting & Crediting Timeline

- Quarterly and Annual Reports submitted in the LRT-CBTS
- Crediting timeline may vary project to project
- Credits will be issued upon CARB review (2019) or upon third-party verification (2020 and beyond)

Reconciliation Requirements and Credit/Deficit Issuance for Fuels

After fuel transaction reporting period is over for a quarter:

- Credits and deficits will be issued for all the fuel quantities reported with transaction types involving no business partners
  - Production, Import, EV Charging, NGV Fueling, FCV Fueling, etc.
- Credits and deficits will be issued only for the reconciled fuel quantities (per FPC) reported with transaction types involving business partners
  - Sale with Obligation
  - Purchase with Obligation

Example: Reconciliation Requirements

	Entity A	Entity B	*Difference*	Reconciliation and Crediting Result
	Sold with Obligation	Purchased with Obligation		
FPC 1 *(Credit Generating Fuel)*	100 gal	100 gal	***0 gal***	Credits for 100 gal move from Entity A to Entity B
FPC 2 *(Credit Generating Fuel)*	200 gal	180 gal	***20 gal***	Credits for 200 gal **remain** with Entity A
FPC 3 *(Deficit Generating Fuel)*	500 gal	500 gal	***0 gal***	Deficits for 500 gal move from Entity A to Entity B
FPC 4 *(Deficit Generating Fuel)*	600 gal	630 gal	***-30 gal***	Deficits for 600 gal **remain** with Entity A

In case of non-reconciliation, TA and TOA are still updated, but credits/deficits are not transferred

Fueling Supply Equipment (FSE) Registration (1)

Fuel or Application Types	Information Required for FSE Registration
CNG	• FSE refers to each station with multiple fueling positions • Provide following for FSE registration - Natural gas utility meter ID for the station - Address and location coordinates - Copy of recent utility bill
LNG and Propane	• FSE refers to each station with multiple fueling positions • Provide following for FSE registration - Unique identifier generated by the company - Address and location coordinates - Invoice or bill of lading for a recent fuel delivery
Hydrogen	• FSE refers to each station with multiple fueling positions • Provide following for FSE registration - Unique ID assigned by Station Operational Status System (SOSS) - Address and location coordinates

Fueling Supply Equipment (FSE) Registration (2)

Fuel or Application Types	Information Required for FSE Registration
Non-residential EV Charging	• FSE refers to each piece of equipment capable of measuring electricity dispensed for EV charging • Provide following for FSE registration - Original Equipment Manufacturer (OEM) serial number and name - Address and location coordinates
Residential EV Charging (Incremental Credits)	• FSE refers to each piece of equipment or on-vehicle telematics capable of measuring electricity dispensed for EV charging • Provide following for off-vehicle meter FSE - Vehicle Identification Number (VIN) - OEM serial number • Provide the following for on-vehicle meter FSE - Vehicle Identification Number (VIN) • VIN will help to prevent duplicate claims and enforce incremental crediting hierarchy • LRT-CBTS to notify if a VIN is already registered or entity higher in hierarchy claims it

Fueling Supply Equipment (FSE) Registration (3)

Fuel or Application Types	Information Required for FSE Registration
Electric Forklifts, eCHE, and eOGV	• FSE refers to each piece of equipment capable of measuring electricity dispensed • Provide following for FSE registration - OEM serial number and name - Address and location coordinates
eTRU	• FSE refers to each transportation refrigeration unit • Provide following for FSE registration - OEM serial number and name

See §95483.2(b)(8) for all Fueling Supply Equipment registration requirements

New Electric Transportation Applications

New electric transportation applications added:

- **eTRU** - electric transport refrigeration unit, which covers Electric Standby TRU, and Hybrid Electric TRU
- **eOGV** - shore power provided to ocean going vessels at-berth
- **eCHE** - electric cargo handling equipment, which covers Bulldozer, Loader, RTG Crane, Side Handler, Top Handler

See §95481(a)(25) definition of "Cargo Handling Equipment" for a complete list of eligible equipment; equipment that meets §95481(a)(153) definition of "Yard Truck" is eligible to report using the EER for a heavy-duty truck in Table 5

- Credit generator for these new applications is the FSE owner for each application type or an entity designated on its behalf
- Electricity must be measured for reporting and credit generation through:
  - Meter on FSE, or
  - Separate meter at the charging facility/location, or
  - On-vehicle telematics

Three-quarter Limit for Book-and-Claim Accounting for Electricity

- Environmental attributes or renewable energy certificates (REC) associated with indirectly supplied electricity can be attached to electricity used as a transportation fuel or used in a hydrogen electrolyzer within a three-quarter timespan
- After three quarters are over, unmatched environmental attributes expire for LCFS purposes

Q1	Q2	Q3	Q4
"X" MWh electricity generated	"X" RECs generated for "X" MWh		
Electricity (kWh) dispensed in Q1	Electricity (kWh) dispensed in Q2	Electricity (kWh) dispensed in Q3	
	Data reported for Q1	Data reported for Q2	Data reported for Q3
	"X" RECs can be retired and matched with electricity supplied and reported in the LCFS for Q1, Q2 or Q3		
Three quarters allowed for book-and-claim accounting			

Three-quarter Limit for Book-and-Claim Accounting for Biomethane

- Environmental attributes associated with biomethane (RNG) injected into the common carrier pipeline can be attached to bio-CNG, bio-LNG, or bio-L-CNG reported in LCFS, or used as a feedstock in hydrogen production within a three-quarter timespan
- After three quarters are over, unmatched RNG environmental attributes expire for LCFS purposes

Q1	Q2	Q3	Q4
"X" therms of RNG injected into the pipeline at source			
Natural Gas (therms) dispensed in Q1	Natural Gas (therms) dispensed in Q2	Natural Gas (therms) dispensed in Q3	
	Data reported for Q1	Data reported for Q2	Data reported for Q3
	"X" Therms of RNG attributes can be matched to the natural gas supplied to California and reported in the LCFS for Q1, Q2 or Q3		
Three quarters allowed for book-and-claim accounting			

Three-quarter Limit to Transfer Credit or Deficit Generator Status for Liquid Fuels

- Fuel that is purchased, produced, or imported with the credit/deficit generator status in one calendar quarter can be sold to another entity with the credit/deficit generator status no later than the end of the third quarter
- After the three quarters are over, the ownership of the fuel can only be transferred without the credit/deficit generator status, however, the credits/deficits associated with the fuel quantity can still be transferred independently

Q1	Q2	Q3	Q4
"X" gallons of fuel ownership is acquired with the credit/deficit generator status			
Fuel (gallons) transferred in Q1	Fuel (gallons) transferred in Q2	Fuel (gallons) transferred in Q3	
	Data reported for Q1	Data reported for Q2	Data reported for Q3
	"X" gallons of fuel can be transferred with the credit/deficit generator status and reported in the LCFS for Q1, Q2 and Q3		
Three quarters allowed for transfer of fuel with credits/deficits			

ZERO EMISSION VEHICLE (ZEV) FUELING INFRASTRUCTURE REPORTING

Hydrogen Refueling Infrastructure Reporting and Credit Generation

- Report quarterly in the LRT-CBTS:
  - CI and Quantity (kg) of hydrogen dispensed per FSE (as reported for fuel pathway-based crediting)
  - FSE uptime for the quarter (based on SOSS data)
- LRT-CBTS will automatically calculate:
  - Company-wide volume-weighted average CI
  - Delta between station capacity and dispensed hydrogen
  - Number of HRI credits
- HRI credits will be issued along with fuel pathway-based credits for a given quarter

DC Fast Charging Infrastructure Reporting and Credit Generation

- Report quarterly in the LRT-CBTS:
  - Quantity (kWh) of Electricity dispensed per FSE (as reported for fuel pathway-based crediting)
  - FSE uptime for the quarter (reporting template)
- LRT-CBTS will automatically calculate:
  - Delta between the FSE capacity and dispensed Electricity
  - Number of FCI credits
- FCI credits will be issued along with fuel pathway-based credits for a given quarter

Cost & Revenue Reporting for ZEV Fueling Infrastructure (1)

- Revenue and cost data must be reported every quarter
- Through a separate reporting template
- Information will be business confidential and kept in secure CARB servers
- Only program averages will be made public
- Draft guidelines for reporting cost and revenue data to be made available for stakeholder input

Cost & Revenue Reporting for ZEV Fueling Infrastructure (2)

Information to be included in cost and revenue reporting on a quarterly basis:

- Total capital expenditures
- Total and average cost of delivered hydrogen or electricity (including demand charges)
- Total maintenance cost
- Total land rental cost
- Total grant revenues or other external funding received towards capital expenses
- Total grant revenue or other external funding towards operational expenses
- Total revenues and average retail price of hydrogen or electricity sales
- Other operational expenses

Capital Expenditure Reporting for DC Fast Charging Infrastructure

Sample of potential costs to be included in capital expenditure (CAPEX) category for FCI projects:

- Permitting fees
- Delivered equipment cost (including battery storage, if applicable)
- Labor
- Materials
- Site renting during construction
- ADA site compliance cost
- Landscaping (when required by permitting authority or site host)
- Utility prep work and infrastructure cost, if paid for by the applicant
- Planning and design, engineering and consulting
  - How to distribute costs across applications?

LCFS CREDIT TRANSFERS

- CREDIT TRANSFER TYPES
  - Type 1 Transfers
  - Type 2 Transfers

LCFS Credit Transfer Types

Starting January 2019, Credit Transfer Form (CTF) in the LRT-CBTS will provide option to log:

- Type 1 Transfer
  - Over-the-counter
  - Single credit delivery (spot trades)
- Type 2 Transfer
  - Over-the-counter
  - Multiple credit deliveries or future credit deliveries (forward trades)

TYPE 1

Credit transfer for an over-the-counter agreement for delivery of credit within 10 days from the date of transaction agreement.

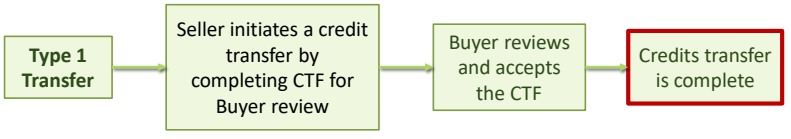
TYPE 2

Credit transfer for an over-the-counter agreement for one of more delivery of credit after 10 days from the date of transaction agreement.

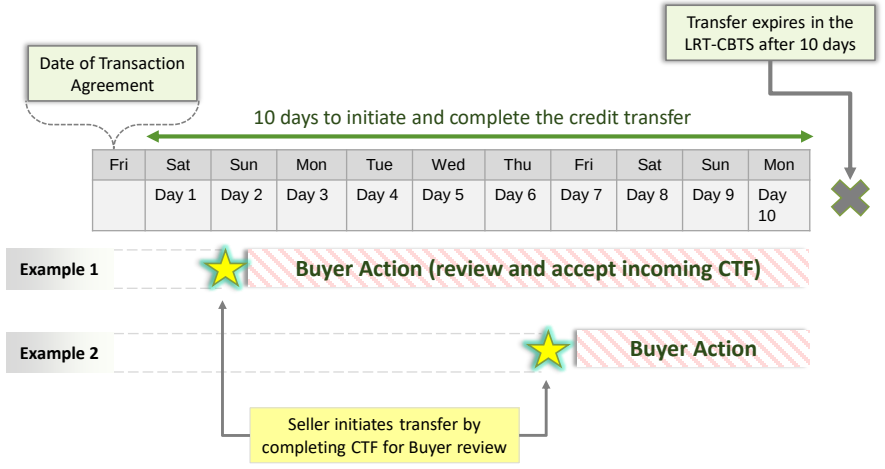
Type 1 Transfer

Similar to existing credit transfer reporting

- Seller and buyer gets 10 calendar days from the Date of Transaction Agreement to initiate and complete the credit transfer
- Date of Transaction Agreement refers to the day when the contract between Buyer and Seller is signed



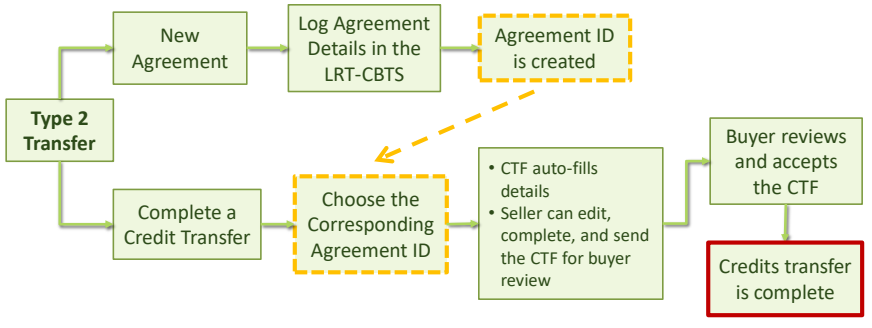
Type 1 Transfer Timing



Type 2 Transfer

Upon choosing Type 2 transfer, the seller will have option to:

- Report a new agreement
- Complete a credit transfer as part of an existing agreement



Type 2 Transfer
Reporting New Agreement

- Seller and Buyer get 10 calendar days from the Date of Transaction Agreement to initiate and report the agreement details for future credit transfers
- The system logs the agreement, creates an Agreement ID which is available (until expired) to be used for completing future credit transfers
- In addition to elements of a CTF, Seller also reports the following:
  - Expected date of last credit delivery or full execution of the agreement
  - Anticipated number of credits to be transferred under the agreement
  - Price or price metric agreed upon
- If the agreement is terminated or amended prior to its full execution, the Executive Officer must be notified within 10 days

Type 2 Transfer
Completing a Credit Transfer

- The process flow and timing is similar to Type 1 transfer, except each Type 2 credit transfer is associated with an Agreement ID
- CTF partly autofill details based on the Agreement details
- Seller can edit, complete, and send the CTF for Buyer review
- Upon Buyer acceptance of the CTF, credits are transferred from Seller account to Buyer account
- CARB could link the reported price for the transfer with the actual agreement and the time when agreement was finalized
- Assists in CARB's market monitoring and audit activities

IMPLEMENTATION OF THIRD-PARTY VERIFICATION

- GENERAL VERIFICATION REQUIREMENTS
  - Entities required to contract for verification services
  - Monitoring plan requirements
  - Fuel pathway allocation accounting for facilities with multiple pathways
- VERIFICATION IMPLEMENTATION TIMING
  - By year and by report type
  - Validation timing and credit generation –Tier 1 and 2 examples
  - CI updates with annual verification of operational CI
- CARB VERIFICATION OVERSIGHT PROGRAM IMPLEMENTATION
  - Accreditation Process
  - Verifier Competency Screening Criteria and Team Requirements
  - Conflict of Interest Self-Assessment and Approval
  - Continuing Oversight

CALIFORNIA AIR RESOURCES BOARD

Entities Required to Contract for Verification*

CARB

Alternative liquid fuel producers and importers

- Chain-of-custody requirements for certain low-carbon feedstocks from point of origin to fuel producer
- Chain-of-custody requirements from fuel producer through importer into California
- May include Carbon Capture and Sequestration (CCS) joint applicants for fuel pathways

Liquid fuel exporters

Reporters of biomethane using book-and-claim accounting

- Bio-CNG/LNG for fueling CNG/LNG vehicles
- Renewable hydrogen (SMR) for fueling hydrogen vehicles

Reporters of propane and fossil CNG/LNG

Petroleum refineries

Reporters of project-based credits

**Hydrogen fueling (excluding book-and-claim biomethane) and electricity are exempt from 3rd-party verification*

Monitoring Plan Requirements—§ 95491.1(c)

- Monitoring plan is designed to describe the data collection, calculation methods, and control procedures to ensure accurate LCFS reporting to CARB to facilitate third party verification and CARB compliance review
- Regulated entities responsible to obtain validation or verification services must develop a monitoring plan for 2019 data reporting
- Must be developed for 2019 data reporting by regulated entities responsible to obtain validation or verification services
- Facilities with multiple fuel pathways must include description of fuel pathway allocation method when applying under CA-GREET3.0 (§ 95491.1(c), § 95491(d)(1)(C))
- Retain and keep updated for review by verifier or CARB
- Entities reporting under both LCFS and MRR may use a single monitoring plan

Fuel Pathway Allocation Methods for Facilities with Multiple Pathways (1)

Method § 95491(d)(1)(C)

- Associate each portion of the total fuel produced with a feedstock during each reporting period (calendar quarter)
- Considers total mass balance of all feedstocks processed at the facility
- Reporting methodology conforming to section 95491 does not require CARB approval
- Different allocation methodology may be used with CARB approval at the time of fuel pathway application (§ 95491(d)(1)(C)2.)

Other Inventory Accounting Methodology

- Yield calculation based on chemical analysis (§ 95491(d)(1)(C)3.)
- Example: starch and fiber ethanol

Fuel Pathway Allocation (2) – Feedstock Inventory Accounting

Requirements from § 95491(d)(1)(C)1:

[Quantity of fuel reported in LRT-CBTS per pathway] =
*[Feedstock counted as processed] * [Average yield]*

- **Feedstock counted as processed** – must be greater than or equal to zero at the end of each reporting period (calendar quarter)
- **Average yield** – facility's average production yield for all feedstocks as determined during pathway certification (based on 3-24 months historical operations data)
- If the **actual yield > average yield**, then the excess fuel must be reported under highest CI pathway

Fuel Pathway Allocation (3) – Data Entry in Annual Fuel Pathway Report

Example: Simplified CI Calculator for Biodiesel/Renewable Diesel

- Data entered for beginning (3.2) and ending (3.5) feedstock inventory values for each calendar quarter must be based on feedstock inventory accounting system
- Ending (3.5) monthly feedstock inventory values may be negative, except for the last month of each calendar quarter—quarter must balance
- Feedstock received (3.3) is to be substantiated with documents onsite

3.1 Reporting Month (MM/YYYY)	3.2 Beginning Used Cooking Oil Inventory	3.3 Oil Received	3.4 Oil Used (Calculated)	3.5 Ending Used Cooking Oil Inventory
	lbs.	lbs.	lbs.	lbs.
01/2020			0	
02/2020			0	
03/2020			0	

Verification Implementation Timing by Year (1)

Third-Party Verification is phased in:

- Beginning in 2019—Verifiers apply for CARB accreditation and take required training and exam(s)
- 2020—Alternative fuel pathway applications require validation by a third-party verifier prior to CARB certification
- 2021—Annual verification of (1) operational CI and (2) transactions in each quarterly report
- 2021—CARBOB and diesel transactions verified
- 2020/21—Project-based crediting reports for 2020 data require verification starting in 2020 for quarterly reports or 2021 for annual reports
- 2023/24—Deferred verification statements due for eligible entities

Verification Timing—Reports used to Calculate Fuel-Based Credits and Deficits (2)

- Annual Fuel Pathway Reports (Operational CI)
  - **March 31, 2021**: Annual report due for 2019-2020 operational data (submit quarterly reports if elect to have quarterly verification reviews)
  - **August 31, 2021**: Annual verification statement due
- Quarterly Fuel Transactions Reports
  - Quarterly* 2020 transactions data for alternative fuel pathways updated to CA-GREET3.0 (transaction types listed in § 95500(c))
  - Quarterly* 2020 transactions data for CARBOB and diesel
  - **August 31, 2021**: Annual verification statement due
- Crude Oil Volumes Reports (MCON Reports)
  - Quarterly and annual reports for 2020 data*
  - **August 31, 2021**: Annual verification statement due
- Low-Complexity/Low-Energy-Use Refinery Reports
  - **March 31, 2021**: Annual report due for 2020 data
  - **August 31, 2021**: Annual verification statement due

**See Table 12. Annual Compliance Calendar for report due dates*

Verification Timing—Project Reports (3)

Project Report Types

- Refinery Investment
- Innovative Crude
- Renewable hydrogen (SMR) used in refineries
- CCS, including direct air capture

Deadlines

- Entities must determine before the initial verification of a Project Report whether to conduct quarterly or annual verification (credits issued after verification)
- If an entity elects to conduct quarterly verification, it may only switch to annual verification at the beginning of a calendar year
- Verification statements for 2020 Quarterly Reports due 5 months after quarterly reports due*
- **August 31, 2021**: Verification statements for 2020 Annual Reports

**See Table 12. Annual Compliance Calendar for report due dates*

Planning for Fuel Pathway Applications

2019 Applications*

- Fuel Pathway Applications with CA-GREET3.0 begins
- Applicant submits fuel pathway application material to CARB, **including supporting documentation**
- CARB reviews data, deems application complete and certifies pathway

2020 Applications*

- 3rd party validation required
  - **Validator reviews pathway application(s) and supporting documentation, conducts site visit**
  - Maximum 6 months to submit Validation Statement to CARB
- CARB deems application complete and certifies pathway

January 1, 2021

- All CA-GREET2.0 pathways deactivated

**One quarter overlap provided for reporting CA-GREET2.0 and CA-GREET3.0 fuel pathways*

CARB VERIFICATION OVERSIGHT PROGRAM IMPLEMENTATION

Accreditation Process— Applying for Accreditation (1)

- In early 2019 staff plans to publish application forms for verification bodies (VB) and individual verifiers*
- Beginning in mid-2019 staff plans to provide verification training for accreditation of individual verifiers
- VB accreditation occurs after the following:
  - VB has submitted an application and meets the requirements in section 95502(b)(1) which includes MRR section 95132(b)(1), including insurance requirements
  - At least 2 lead verifiers complete CARB training (one may be a sub- or independent contractor), and pass exam if applicable
  - 1 lead verifier must be an employee to conduct independent review
  - Templates received (risk assessment, sampling, issues log for each report type specified in § 95500 that VB intends to verify)

*Example forms for MRR verification program: https://ww2.arb.ca.gov/verification

Accreditation Process—Verifier Training (2)

- CARB accreditation training - may offer choice of in-person, live remote, or recorded-interactive options
- Candidates not eligible for fast-track accreditation must take general LCFS verification training and pass exam(s) prior to accreditation
- Candidates eligible for fast-track accreditation must complete LCFS-specific training prior to accreditation
- Accredited individual verifiers and VBs will be posted on CARB's website

Questions regarding CARB LCFS accreditation should be sent to johnnie.raymond@arb.ca.gov

* Example forms for MRR verification program: https://ww2.arb.ca.gov/verification

Verifier Competency Screening Criteria

General Verifier Requirements:

- Must be employed, or contracted by, a CARB-accredited LCFS VB
- Bachelor's degree in relevant field or equivalent work experience
- Two years of professional experience:
  - Emissions data management, emissions technology, emissions inventories, environmental or financial auditing, life cycle analysis, transportation fuel production, or other necessary technical skills to conduct verification

"Lead Verifiers" must also meet one of these requirements:

- Project manager, or lead person, for no less than four years
- Eligible for fast-track accreditation as a lead verifier:
  - Accredited as a lead verifier under MRR or Cap-and-Trade Regulations
  - Lead for attestation services or QAP audits under U.S. EPA RFS
  - Lead for a biofuels certification audit under an international certification system: ISCC, RSB or Bonsucro

Verification Team Requirements

Must include at least one member with specified competency that is not also the independent reviewer, when verifying

- Alternative Fuel Pathway Applications and Reports
  - Experience in alternative fuel production technology and process engineering
- Petroleum-Based Fuel Reports*
  - CARB accreditation as an oil and gas systems specialist pursuant to MRR

**Quarterly Fuels Transactions Reports submitted by producers and importers of gasoline or diesel, Crude Oil Quarterly and Annual Volumes Reports, and Project Reports as listed in §95500*

Conflict of Interest Self-Assessment and Approval

- Staff is developing standard forms for submitting Conflict of Interest (COI) and Notice of Verification Services (NOVS) and plans to make them available in 2019
- COI self assessments are required prior to contracting to provide validation/verification services
  - Low potential for COI—CARB pre-approval not required, but self-assessment must be submitted prior to starting verification services
  - Medium potential for COI—CARB approval of COI self-assessment of and mitigation plan required prior to starting verification services
  - High potential for COI –CARB will not approve verification services
- CARB staff experience is that submittal of COI and NOVS early in the process is necessary to help avoid missing verification deadlines
- CARB will publish and continually update a list of entities subject to verification that have not yet hired a VB

Continuing Oversight

CARB will be notified before verification services begin so that we can plan audit and oversight activities

Consistent with CARB's other verification programs, we plan to conduct audits of specific verifications and verification body management systems

- Audits will involve review of required documentation, source data, and other information to ensure LCFS regulation requirements were met and conclusions were justified
- Audits may involve shadowing verifier on site visits

CARB maintains quality standards that all verification bodies must meet

CARB will provide answers to compliance questions directly to regulated entities and verifiers

Petition process when interpretation questions are not resolved between regulated entities and verifiers prior to verification deadline

CARB discretion to set aside a positive or qualified positive verification statement and require reverification with a different VB when potential for material misstatement found or potential for high COI

VB/Verifier accreditation may be suspended or revoked if deemed to be non-compliant

QUESTIONS?

Provide written feedback to
LCFSworkshop@arb.ca.gov

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THANK YOU